

**Appendix**

**D.5**

**Documentation of BMP Ability to Meet  
the 80% TSS Removal Requirement**

BMPs employed at new development in the State of Maryland are now required to meet a performance standard under the recently issued CZARA Coastal Zone 6217(g) management measures guidance (US EPA, 1993). The specific management measures read “After construction is completed and the site is permanently stabilized, reduce the average annual total suspended solid (TSS) loadings by 80% percent...on an average annual basis.”

Based on the 90% capture sizing criteria and published pollutant removal performance data, it may be presumed that the BMPs contained on the Acceptable BMP List outlined in Chapter 2 can meet the 80% TSS removal performance standard, if they are designed in accordance with the BMP performance criteria outlined in Chapter 3. The Acceptable BMP List will be periodically updated as new monitoring research is conducted and new stormwater treatment technologies are tested.

Table 1 shows the median sediment removal rate measured or projected for the nineteen stormwater BMPs currently on the approved list. The Table was developed as part of a national assessment of stormwater BMP monitoring research by the Center for Watershed Protection (Brown and Schueler, 1997).

It should be clearly noted that the median values were obtained from a range of research studies that varied widely in respect to geography, climate, design, treatment volume, sampling intensity, and removal efficiency calculation method. In particular, the averages for some pond and wetland designs reflect facilities that were under-sized or poorly designed, which tends to skew averages lower than they would otherwise be. Consequently, the numbers in Table 1 should be considered only as an indicator of expected pollutant removal performance in the State of Maryland.

As can be seen from Table 1, many BMPs on the list are capable of meeting the 80% TSS removal requirement. Nine of the BMPs, however, had median removal rates that ranged from 60% and 79%. As noted earlier, these slightly lower removal rates may have been caused by the fact that datasets include some under-sized or poorly designed practices that reduce the overall median.

In addition, performance monitoring data was not available to assess five practices, and their sediment removal rate had to be projected based on the performance of similar systems. They are:

- P-5 Pocket Pond (presumed to be similar to P-2)
- I-2 Infiltration Basin (published rate based on land application studies [Schueler, 1987])
- F-2 Underground Sand Filter (presumed to be similar to F-1)
- F-5 Pocket Sand Filter (presumed to be similar to F-1)
- F-6 Bioretention (presumed to be similar to O-1)

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**Table D.5.1** TSS Removal Performance List

ACCEPTABLE BMPs	N	TSS	80% ?
P-1 Micropool ED	6 (a)	61	yes (b)
P-2 Wet Pond	30	77	yes
P-3 Wet ED Pond	6	60	yes (b)
P-4 Multiple Pond	pr- W-3	72	yes
P-5 Pocket Pond	pr- W-4	nd	yes
W-1 Shallow Wetland	14	84	yes
W-2 ED Wetland	5	62	yes (b)
W-3 Pond/Wetland	11	72	yes (b)
W-4 Pocket Wetland	1	76	yes (b)
I-1 Infiltration Trench	2	89	yes
I-2 Infiltration Basin	0	nd	yes
F-1 Surface Sand Filter	6	83	yes
F-2 Underground Sand Filter	see F-1	nd	yes
F-3 Perimeter Sand Filter	3	79	yes
F-4 Organic Filter	2	81	yes
F-5 Pocket Sand Filter	0	nd	yes
F-6 Bioretention	0	nd	yes (pr)
O-1 Dry Swale	4	93	yes
O-2 Wet Swale	5	74	yes
Notes: N = number of BMPs sampled nd = No data pr = projected removal , based on similar facilities (a) data from dry ED ponds without micropools (b) 80% removal can be achieved under proposed design criteria, current database is biased by under-sized or poorly designed facilities			

**References**

Brown, W. and T. Schueler. 1997. National Pollutant Removal Performance Database for Stormwater BMPs. Center for Watershed Protection. Chesapeake Research Consortium. 220 pp.

U.S. EPA. 1993. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. Issued under authority of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990. No. 840-B-92-002. EPA Office of Water. Washington, D.C.